



The Global Nuclear Energy Partnership (GNEP)

Grid-appropriate Reactors

The Global Nuclear Energy Partnership (GNEP) calls for an expanded program to design, build, and export nuclear reactors that are cost effective and well suited to conditions in developing nations. Addressing this market is essential for safely expanding nuclear energy in developing nations and small-grid markets without increasing proliferation concerns.

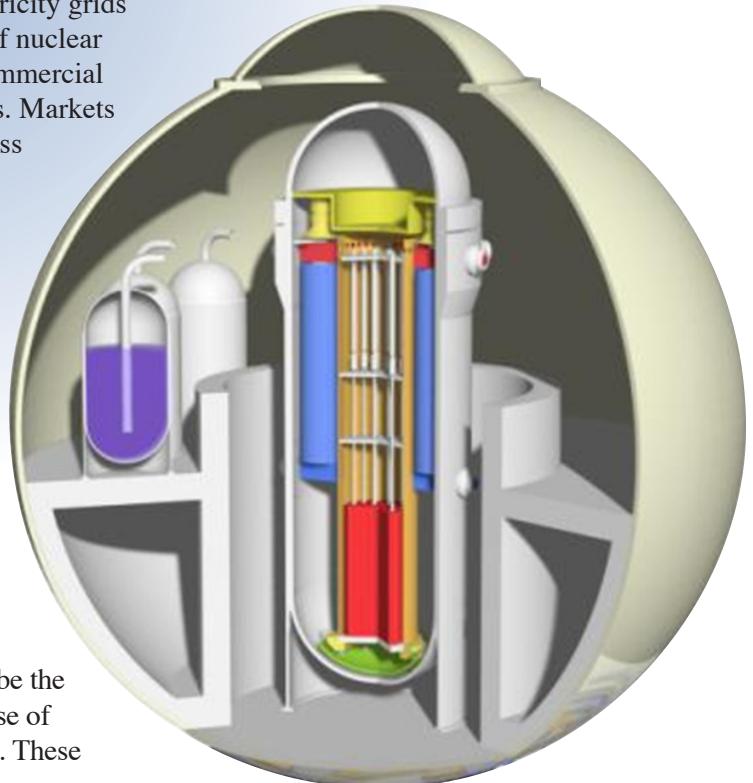
Light water reactors dominate the commercial use of nuclear power. Historically, the requirements of large national markets with big electricity grids have driven the development of nuclear power reactors, resulting in commercial units of about 1,000 megawatts. Markets with much smaller grids and less well-developed technical infrastructures have not had much impact on power reactor designs and technologies. A different reactor design approach, tailored to this market segment, could help meet the rising power demands associated with economic growth and urbanization, while avoiding the use of fossil fuels that would otherwise be burned in power plants.

Grid-appropriate reactors may be the best choice for expanding the use of nuclear energy in these markets. These

reactors will be safe, simple to operate, more proliferation-resistant and highly secure. The U.S. will seek agreement on key safety, proliferation and safeguards standards, which would be integrated into the design.

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An example of a small-grid reactor is IRIS, International Reactor Innovative and Secure (www.irisreactor.org)



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How the reactors would work

Grid-appropriate, more proliferation-resistant reactors could incorporate numerous features that would help address the intended market:

- Fuel designs that offer very long-life fuel loads (possibly ones that last the entire life of the reactor, so that refueling is not needed).
- Effective, yet inexpensive IAEA safeguards to promote non-proliferation that might include remote monitoring.
- Physical protection against sabotage and other terrorist acts.
- Standardized modular designs in the 50 to 350 megawatt range.
- Potential for district heating and industry and potable water production.
- Fully passive safety systems.

- Simple operation that requires minimal nuclear infrastructure.
- Use of as much existing licensed or certified technology as possible.
- Use of advanced manufacturing techniques.

A better choice for customers

Today, there are no fully developed or installed reactors that have all these features. Further evaluation and exploration of these concepts with GNEP member nations would support future decisions on continued development and, eventually, deployment.

Research, development and preliminary design of several candidate grid-appropriate reactors are underway in a number of advanced industrialized countries. GNEP seeks to form international partnerships to accelerate certification of marketable designs and deploy operational demonstration plants.

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